

**ABSTRACT**

**MULTI-CARRIER COMMUNICATION SYSTEM WITH SAMPLE RATE PILOT  
CARRIER AND TIME DIVISION DUPLEXING FRAME RATE PILOT CARRIER**

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10 In a multi-carrier communication system wherein data are  
transferred bi-directionally in a time division duplexed way, a first  
pilot carrier is used to transfer a sample rate between two  
transceivers (VDSL\_LT, VDSL\_NT) and a second pilot carrier is used to  
15 transfer a time division duplexing frame rate between the two  
transceivers (VDSL\_LT, VDSL\_NT). The first pilot carrier has an  
instantaneous frequency that is a fraction of the sample rate of the  
first transceiver (VDSL\_LT) and is orthogonal to other carriers used in  
the multi-carrier communication system. The second pilot carrier has  
a mean frequency that is a fraction of the time division duplexing  
frame rate and is also orthogonal to the other carriers used in the  
multi-carrier communication system. The second pilot carrier is  
different from the first pilot carrier.